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**(54) [Name of the Invention]**

**Industrial Dust-Proof Mask**

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**(71) Patent Assignee: Hitachi Zosen Company**

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*[Note: Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.]*

## **Description of the Invention**

### **1. Name of the Invention (Design)**

#### **Industrial Dust-Proof Mask**

### **2. Scope of the practically newly proposed registered claims**

- (1) Industrial dust-proof mask that is an industrial dust-proof mask where the glasses and the mask are connected through a breathing (air suction) tube as at the appropriate location of the glasses frame body a breathing opening is provided, which is equipped with a filter and an air suction valve, and on the other hand, on an appropriate location of the frame body of the above glasses, a breathing in and out opening that transports the breathing air of the inside of the mask to leave the mask, is provided, and the above breathing in and out opening and the front surface part of the mask are connected through a breathing tube, and in addition on the lower part of the mask an air expulsion opening is provided that is equipped with an air expulsion valve.

### **3. Detailed Description of the Invention (Design)**

This invention is an invention about an improvement of an industrial application dust-proof mask, and especially, it is an invention about a dust-proof mask that can prevent the generation of dust on the monocular glasses that are used together with a dust-proof mask used in grinder industrial application where monocular glasses are to be worn.

Namely, it is known that, usually, in the case when the glasses part and the mask part have the same air space, through the exhaling and inhaling, fogging of the glasses part is generated, however, even if the glasses and the mask are separate bodies, through the effect of the temperature difference between the outside air and the skin temperature, fogging on the glasses part is inevitably generated, and there has been the problem that it can be said that unfavorable conditions are generated at the time of the practical industrial operation.

The present invention is an invention that has as a goal to suggest an industrial application dust-proof mask that solves the above described problems, and it is characterized by the fact that the glasses and the mask are connected through a breathing (air suction) tube as at the appropriate location of the glasses frame body a breathing opening is provided, which is equipped with a filter and an air suction valve, and on the other hand, on an appropriate location of the frame body of the above glasses, a breathing in and out opening that transports the breathing air of the inside of the mask to leave the mask, is provided, and the above breathing in and out opening and the front surface part of the mask are connected through a breathing tube, and in addition on the lower part of the mask an air expulsion opening is provided that is equipped with an air expulsion valve; and therefore, the temperature difference between the air that is inside and outside of the mask is made to be as small as possible, and the generation of fogging is prevented. Here below, examples are shown and the present invention is described in more details.

Figure 1 shows the Practical Example 1 in a state where it is being used, and Figure 2 shows an enlarged cross sectional view in the vertical direction of the same.

In the figures, (1) indicates monocular glasses (here below, simply called "glasses"), (2) represents the frame body of the glasses (1), and the above frame body (2) is such that the inner side of the glasses (1) must be air tight, and it is made of a material that has flexibility properties, and it is shaped in such a shape so that it bonds tightly to the face surface. (3) is a belt that is used for the wearing of the glasses (1).

(4) is a breathing opening that is provided on the upper part of the above described frame body (1) in order to breath and draw the outside air inside the glasses (1), and on the above breathing opening (4) the filter (5) and the breathing valve (6), are provided. Naturally, there are no limitations regarding the position of the breathing opening (4) on the upper part of the frame body (2), and the main point is that it is a good option if it is provided at a location that does not limit the viewing field of the operator and also it is a good option if it is provided at a location where the dust floating is as little as possible, and also it is preferred that it is provided so that the opening direction of the above breathing opening (4) is protected from floating dust.

(7) is a breathing in and out opening that is provided on the lower part of the frame body (2), and it is an opening in order to forward the breathing air inside the glasses (1) towards the described further below dust-proof mask (8) (here below, simply called "mask").

Namely, (8) is a mask that has a structure that is formed as an air tight space is formed between it and the face surface of the user (A), and on the front surface of the mask (8), the breathing air introduction opening (11) is provided, which is equipped with the filter (9) and the breathing air valve (10), and at the lower part position of the above mask (8) the air expulsion opening (13) is provided, which is equipped with the air expulsion valve (12), and the breathing transmission and introduction opening (7) of the glasses (1) and

the breathing introduction opening (11) of the mask (8) are connected by the flexible breathing tube (14), so they can be freely attached and detached.

Moreover, regarding the structure of the above described Practical Example, it shows an example of the case where the structure is formed so that the glasses (1) and the mask (7) can also be used correspondingly as separate units, and it is a case that satisfies the goal of the present invention described in the previous paragraphs; and it is also a good option if the structure is formed so that on the glasses (1) and the mask (8) a solidly fixed breathing tube (14) is provided, and in that case, the filter (9) and the breathing valve (10) become unnecessary. Also, according to the above described practical example, the number of the breathing tubes (14) and the diameter size have not been provided, however, depending on the industrial site environment, the season, etc., the appropriate number and the appropriate diameter size can be used and, for example, if it is in a summer season location, under conditions where fogging is easy, two breathing tubes (14) are provided on the right and the left side, or the diameter of the breathing tube (14) is made to be large.

The industrial application dust-proof mask according to the present invention with the structure as shown according to the above described example, of course, demonstrates sufficient dust-proof effect, and it maintains the inside and outside air of the glasses (1), which are present in the upper part position of the mask (8) at approximately the same temperature, and it is possible to prevent as much as possible the fogging of the glasses (1).

Namely, the air that must be sucked and drawn inside the mask (8), is first sucked and drawn inside the glasses (1) prior to entering inside the above glasses (1), and the air sucked inside the above glasses (1) passes from the breathing forwarding and introduction opening (7) through the breathing tube (14) and through the sucked air introduction opening (11) of the mask (8) it is sucked in and introduced inside the mask (8), and it is dedicated to the breathing of the operator (A), and the air that is breathed out by the operator (A) is expelled through the air expulsion opening (13). As a result from that, the air that is inside the glasses (1) is in a state as the normal air, and the temperature of the air inside and outside of the glasses (1) is maintained approximately the same temperature, and the fogging of the glasses (1) is prevented as much as possible. Moreover, in this case, the air inside the glasses (1) passes through the filter (5) and is then sucked and drawn in, and because of that there no danger at all of dust entering in the eyes of the operator.

According to the above described explanation, in the case of the present invention it is mask where essentially, the outside air that must be sucked in and breathed passes through the filter of the mask and it is transmitted towards the inner side of the glasses and it is introduced into the mask, and after the inhaling and exhaling of the user, it is expelled from the bottom part of the mask, and because of that it has the characteristic that a filter can be provided on the breathing (suction) opening of the glasses, and there is no danger that dust would enter in the eyes of the operator, and also because of the same reason, the temperature of the air inside and outside of the glasses becomes almost the

same, and it is said that there is no generation of fogging, and it is considered that the industrial application properties are significantly improved.

Also, in the case of the present design, it is a structure where as it is shown according to the examples shown in the figures, a breathing tube is provided so that it can be easily attached and detached relative to the glasses and the mask, and also, it is a structure where a filter and a suction (breathing) valve are provided on the mask and through that it becomes also possible that the glasses and the mask can be used correspondingly separately.

#### **4. Brief Explanation of the Figures**

The figures show one practical example according to the present invention and Figure 1 represents a diagram of the conditions as the mask is being worn on, and Figure 2 is an enlarged vertical cross section view diagram of the same.

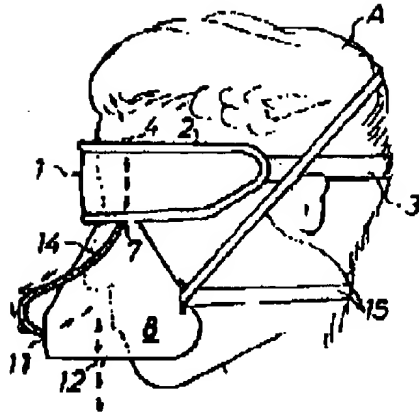
(1) represents the glasses, (2) represents the frame body, (4) represents the suction (breathing) opening, (5) represents the filter, (6) represents the suction valve, (7) represents the breathing forwarding/supply opening, (8) represents the mask, (11) represents the sucked air introduction opening, (12) represents the air expulsion valve, (13) represents the air expulsion opening, and (14) represents the breathing tube.

**Patent Assignee: Hitachi Zosen Company**

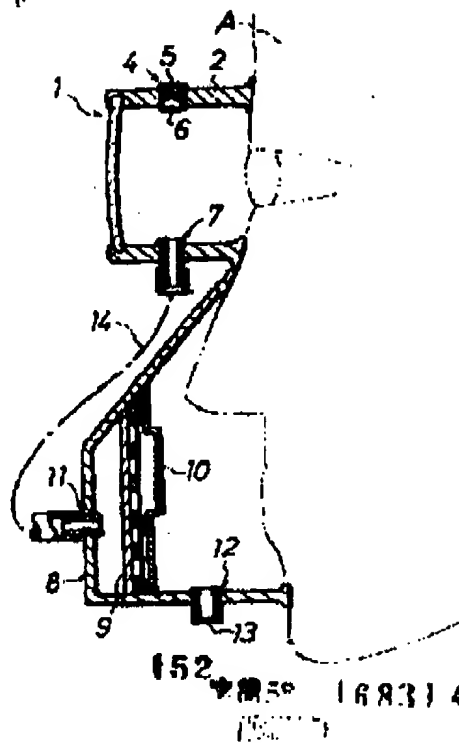
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第 1 圖



第 2 圖



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54 作業用防護マスク

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## 明 細 書

### 1. 考案の名称

#### 作業用防塵マスク

#### 2. 実用新案登録請求の範囲

(1). メガネとマスクとを吸気管で連結してなる作業用防塵マスクであつて、メガネの枠体の適宜箇所にはフィルター及び吸気弁を備えた吸気口を付設する一方、該メガネの枠体の適宜箇所にはメガネ内の吸気をマスクへと送る吸気送給口を付設して該吸気送給口とマスクの前面部とを吸気管で連結し、加えて、マスクの下部に排気弁を備えた排気口を付設してなるを特徴とする作業用防塵マスク。

#### 3. 考案の詳細な説明

この考案は、作業用防塵マスクの改良に係り、特に一眼鏡メガネの着用を義務付けられているクレンジング作業用防塵マスクと併用する一眼鏡メガネに生ずる曇りの発生を防止できるようにした防塵マスクに関する。

すなわち、一般に、メガネ部とマスク部とが同一空間を共有する場合に呼吸によりメガネ部に曇

(1)

146

実開58-16831-4



## 公開実用 昭和 58— 168314

りが生ずることは周知であるが、メガネとマスクが別体であつても、外気と体温との温度差の影響でメガネ部には必然的に曇りを生じ、実働作業時に不都合を来すという問題点があつた。

本考案は上記問題点を解決した作業用防護マスクの提供を目的としてなされ、その特徴とするところは、メガネの枠体の適宜箇所にはフィルター及び吸気弁を備えた吸気口を付設する一方、該メガネの枠体の適宜箇所にはメガネ内の吸気をマスクへと送る吸気送給口を付設して該吸気送給口とマスクの前面部とを吸気管で連結し、加えて、マスクの下部に排気弁を備えた排気口を付設し、以つて、メガネの内側に常時外気を吸引流通せしめることに依り、メガネ内外の空気の温度差を可及的に小となし、曇りの発生を防止するようにした点にある。以下、例示図面に基き、詳述する。

第1図は本考案の1実施例の着用状態を表示し、第2図は同様大縦断面図を抜く。

図中、(1)は一服メガネ（以下、単に「メガネ」と称す）、(2)はメガネ(1)の枠体で、該枠体(2)は、

(2)

147



メガネ(1)の内側を気密とすべく、弾力性のある材質のもので顔面に密接させ得る形状に形成してある。(3)はメガネ(1)の着用ベルトを示す。

(4)は外気をメガネ(1)内に吸引すべく前記弁体(2)の上部に付設された吸気口で、該吸気口(4)にはフィルター(5)及び吸気弁(6)が付設されている。勿論、吸気口(4)の位置は、弁体(2)の上部に限るものではなく、要は、作業者の視界を制しない位置で且つ塵埃の飛来が可及的に少ない箇所に設定すればよく、該吸気口(4)の開口方向も、塵埃の飛来方向を避けるように設定することが好ましい。

(7)は弁体(2)の下部に付設された吸気送給口で、これはメガネ(1)内の吸気を後述する防護マスク(8)(以下、単に「マスク(8)」と称する)へ送給するためのものである。

すなわち、(4)は使用者(A)の顔面との間に気密空間を形成する構成とされたマスクで、該マスク(8)の前面にフィルター(5)及び吸気弁(6)を備えた吸気導入口(9)が付設され、該マスク(8)の下部位置に排気弁(6)を備えた排気口(10)が付設されており、メガネ

(3)

**公開実用 昭和 58— 168314**

(1)の吸気送給口(7)とマスク(8)の吸気出入口(4)との間には、可撓性のある吸気管(4)を着脱自在に連結している。又、(4)はマスク(8)の着用ベルトである。

なお、上記実施例の構成は、メガネ(1)及びマスク(7)がそれぞれ単体としても使用可能のように構成した場合を例示したもので、冒頭に記した本考案の目的を満足させるだけの場合は、メガネ(1)とマスク(8)とに吸気管(4)を固着した構成としておいても良く、この場合に、フィルター(6)及び吸気弁(4)は不要なものとなる。又、上記実施例では、吸気管(4)の本数、径の大きさに付言しなかつたが、これらは、作業現場の環境、季節等によつて適宜本数、若しくは適宜径大を採用するもので、例えば、夏場に向つて曇り易い状況下であれば吸気管(4)を左右2本付設するとか、吸気管(4)の径を大きくするとかするものである。

上記例示した構成の本考案作業用防護マスクは、防護効果を充分に発揮することは勿論のこと、マスク(8)の上部位に存するメガネ(1)の内外の空気が略同温に保持し得て、メガネ(1)の曇りが可及的

に防止できる。

すなわち、マスク(8)内に吸引されるべき空気は、マスク(8)内に入る前にまずメガネ(1)内に吸引され、該メガネ(1)内の吸気が吸気送給口(7)から吸気管(4)を通つてマスク(8)の吸気導入口(10)へと吸い込まれてマスク(8)内に入り、作業者(A)の呼吸に供されるのであり、作業者(A)の吐出空気は排気口(4)から排出される。この結果、メガネ(1)内の空気は常時換気されている状態にあり、メガネ(1)の内外の空気温度が略同一に保持され、メガネ(1)の曇りが可有效的に防止されることになる。なお、この場合、メガネ(1)内の空気はフィルター(5)を通して吸引されるため、塵埃が作業者の眼に入る恐れは全くない。

以上説明したように本考案は、本来マスクのフィルターを介して吸引すべき外気をメガネの内側へ運らせてマスクへと導き、使用者の吸引吐出後マスクの下部から排出するようにしたもので、メガネの吸気口にフィルターが備えられていて、塵埃が作業者の眼に飛び込む恐れは全くなく、何よ

(5)

150

**公開実用 昭和 58— 168314**

りもメガネ内外の空気温度が略同一となつてメガネに曇りを生じないという長所を有し、作業性の向上に大いに寄与する考案である。

又、本考案は、例示図面に示す如く吸気管をメガネ及びマスクに対し着脱自在に装着する構成とし且つマスクにフィルター及び吸気弁を備えさせる構成とすることにより、メガネ、マスクがそれぞれ個別にも使用できるようになせる。

も図面の簡単な説明

図面は本考案の1実施例を示すもので、第1図は着用状態図、第2図は第1図の拡大縦断面図である。

(1)はメガネ、(2)は棒体、(4)は吸気口、(5)はフィルター、(6)は吸気弁、(7)は吸気送給口、(8)はマスク、(11)は吸気導入口、(12)は排気弁、(13)は排気口、(14)は吸気管。

実用新案登録出願人 日立造船株式会社

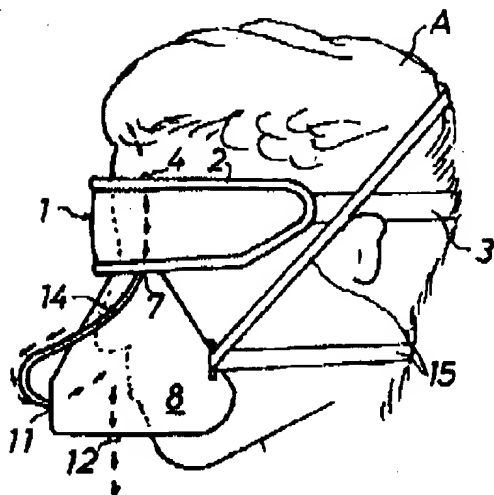
代理人 清 上 清 蔵

(ほか1名)

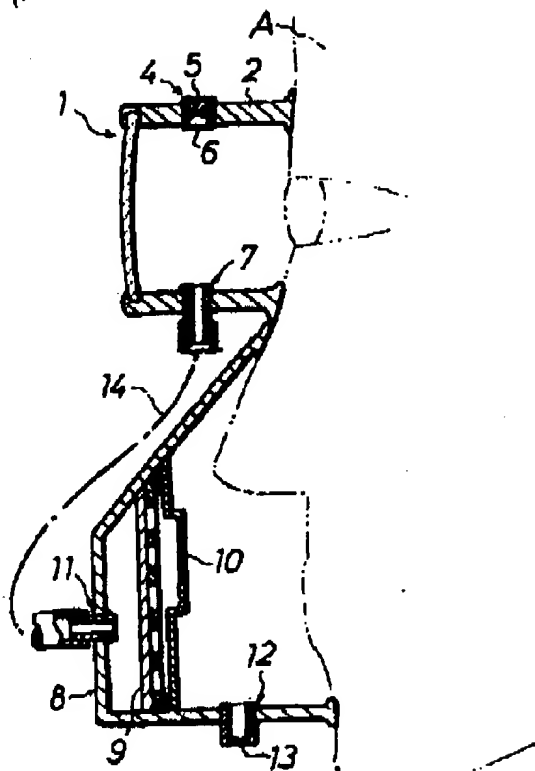
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151

第 1 図



第 2 図



152 申請 50 - 168314

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